July 12, 2013

NCDENR-DWM, Solid Waste Section
Mail Service Center # 1646
Raleigh, North Carolina, 27699-1646

Attention: Ms. Jacylnne Drummond

Reference: **MONITORING WELL REPLACEMENT**
White Street Landfill, Phase II, Permit No. 41-03
Greensboro, North Carolina
S&ME Project No. 1584-98-081

Dear Ms. Drummond:
On behalf of the City of Greensboro, S&ME Inc. (S&ME) requests permission to replace compliance monitoring well II-4 with a new well of similar design. Well II-4 monitors the shallow aquifer in an area north of a portion of White Street Landfill, Phase II (e.g. closed MSW landfill with an active C&D landfill piggy backed on top). The location of well II-4 is depicted on **Figure 3,** a recent groundwater flow map. Monitoring well II-4 has exhibited higher than normal turbidity for a number of years. As evidenced by the attached *Groundwater Sampling Field Data* form for April 30, 2013, well II-4 was purged at approximately 100 milliliters per minute for over 1 hour, with little to no water level drawdown, yet turbidity levels remained well over 200 NTU. For groundwater sampling, a turbidity level of 10 NTU or less was established as the one of the target stabilization criteria. The April 2013 turbidity levels are not atypical for this well.

Previously, S&ME redeveloped the well on more than one occasion in an effort to reduce the turbidity; however, the turbidity problem has persisted. It has been our contention that the high turbidity level exhibited by the water yielded from this well is a source for the somewhat elevated metals concentrations detected at this location.

To remove the turbidity variable from the post-closure water quality assessment analyses we plan to replace the well with a new one installed less than 10 feet away, constructed with a similar total depth and well screen interval. The original well had a 10 foot well screen interval, which left the top of the well screen below the surface of the water table at times. We propose the use of a 15 foot well screen to reduce such occurrences. The replacement well will improve the performance of this compliance well, which is an integral part of the Facility's detection monitoring system.

Attached is a copy of the *Well Completion Record* for well II-4 and a diagram depicting proposed construction details for the replacement well to be named II-4A. Following installation, the new well will be developed and slug testing conducted to determine the

hydraulic conductivity for the monitored portion of the aquifer. A Well Construction Record, well boring log, and slug test results will be provided to you within 30 days of well completion.

Please review this request and provide the Facility with your written approval to proceed with the planned well replacement. Do not hesitate to call our office at (336) 288-7180 if you have any questions or comments. We appreciate your assistance in the management of this project.

Sincerely,
S&ME, Inc.

NORTH CAROLINA LICENSED GEOLOGIST ENGINEERING ENVIRONMENTAL

Edmund Q.B. Hennigan, L.G.
Environmental Department Manager

Wayne H. Watterson, P.E.
Senior Engineer

EQBH/WHW/wj

Attachments: Figure 3: Groundwater Flow Map
Groundwater Sampling Field Data for well II-4
Well Completion Record for Well No. 9 / II-4
Proposed – Monitoring Well Installation Sketch

cc: Gail Hay, P.E. City of Greensboro

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TABLE 1
GROUNDWATER ELEVATION DATA SUMMARY
PHASE II - WHITE STREET LANDFILL
GREENSBORO, NORTH CAROLINA
S&ME PROJECT NO. 1584-98-081

Well No.	Type	Elevation TOC (feet)	Depth of Well (feet)	Static Water Levels			
				October 2012		April 2013	
				DTGW (feet)	Elevation (feet)	DTGW (feet)	Elevation (feet)
II-1	Compliance	692.34	26.50	16.75	675.59	14.38	677.96
II-2	Compliance	690.05	32.24	20.40	669.65	18.77	671.28
II-3	Compliance	688.05	32.45	17.81	670.24	17.89	670.16
II-3B	NES	not surveyed	27.70	14.16	not surveyed	13.35	not surveyed
II-4	Compliance	703.27	28.72	13.68	689.59	9.50	693.77
II-5	Compliance	714.31	15.96	7.76	706.55	6.56	707.75
II-6	Compliance	698.47	20.57	12.64	685.83	8.89	689.58
II-7	Compliance	684.08	27.54	14.29	669.79	12.27	671.81
II-7B	NES	687.21	101.50	17.60	669.61	16.35	670.86
II-8	Compliance	707.09	34.95	9.70	687.39	9.11	697.98
II-9	NES	697.01	25.10	10.75	686.26	9.60	687.41
II-12	Compliance	700.97	22.90	11.23	689.74	8.89	692.08
SMW-1	Sentinel	690.26	18.40	9.88	680.38	6.29	683.97
SMW-3	Sentinel	690.84	25.00	9.33	681.51	9.41	681.43
SMW-4	Sentinel	694.49	23.90	7.21	687.29	5.82	688.67
MW-13	Compliance	741.30	33.78	22.11	719.19	19.28	722.02
MW-14	Compliance	795.30	34.28	28.16	737.14	29.22	736.08

TOC = Top of Casing. Elevations determined by survey: HDR Engineering, Inc.
Depth of well data as reported by BPA Environmental & Engineering, Inc.
DTGW = Depth to Groundwater
Elevation = calculated groundwater elevation
NG= Not Gauged

LEGEND:
- (2) SURFACE WATER SAMPLING POINT
- MONITORING WELL LOCATION
- (748.99) GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER CONTOUR LINE
- OFF-SITE PROPERTY OWNED BY THE CITY OF GREENSBORO

BUFFALO CREEK
NORTH
WHITE STREET
YARD WASTE AND COMPOSTING AREA
I-1
I-2
I-3
I-4
I-5
II-1 (677.96)
II-2 (671.28)
II-3 (670.16)
II-4 (693.77)
II-5 (707.75)
II-6 (689.58)
II-7 (671.81)
II-7B (670.86)
II-8 (697.98)
II-9
II-11
II-12 (692.08)
MW-13 (722.02)
MW-14 (736.08)
672.00
682.00
692.00
702.00
690.00
720.00
730.00
730.00

GRAPHIC SCALE
800 400 0 800
SCALE: 1" = 800'

GROUNDWATER FLOW MAP
PHASE II
WHITE STREET LANDFILL
GREENSBORO, NORTH CAROLINA

SCALE: AS SHOWN
JOB NO. 1584-98-081B
DRAWN BY: DSB/RDM
DATE: JUNE 2013
CHECKED BY: SC
FIGURE NO. 3

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GROUNDWATER SAMPLING FIELD DATA

Location: White Street Landfill
Project No.: 1584-98-081
Source Well: 4103-II4

Locked?: Yes: x No:
Sampled By: Gary Simcox

Purge Date: Tuesday, April 30, 2013
Purge Time:
Sample Date: Tuesday, April 30, 2013
Sample Time: 1710
Weather: Cloudy
Air Temp: 55 *F

Water Level & Well Data

Depth to water from measuring point: 9.50 feet
Depth to well bottom from measuring point: 30.00 feet
Height of water column: 20.50 feet
Measuring point: Top of Casing

Well Purging & Sample Collection

Purge Method Bladder Pump
Sample Method Bladder Pump
Purge Rate 100 ml/min
Control Settings On: 3.5 sec.
Off: 26.5 sec.
Pressure: 26 psi

Purge Time
Start 1545 Stop 1705
Sample Collection Time
Start 1705 Stop 1710

Volume of water in well
2" well:
height: 20.5 x .163 = 3.3415

Volume of water removed 7.0 gallons liters x

Was well purged dry Yes No x

Field Analyses

*Stabilization Parameters

Time	Date	Temp	pH	Conductivity	*ORP	*D.O.	*Turbidity	DTW
1545	4/30/2013							
1550	4/30/2013	16.65	7.33	0.851	227	3.82	123.00	9.82
1555	4/30/2013	16.59	7.33	0.886	228	3.72	81.00	9.78
1600	4/30/2013	16.75	7.34	0.892	229	3.46	76.40	9.77
1605	4/30/2013	16.82	7.36	0.887	230	3.18	81.20	9.77
1610	4/30/2013	16.92	7.40	0.893	230	2.93	74.40	9.76
1615	4/30/2013	16.93	7.40	0.895	230	2.87	89.90	9.78
1620	4/30/2013	16.63	7.42	0.900	231	3.02	107.00	9.77
1625	4/30/2013	16.81	7.37	0.907	231	2.76	89.40	9.77
1630	4/30/2013	16.60	7.39	0.918	232	2.66	142.00	9.77
1635	4/30/2013	16.10	7.39	0.926	235	2.62	161.00	9.77
1640	4/30/2013	16.11	7.40	0.946	237	2.67	217.00	9.76
1645	4/30/2013	15.75	7.39	0.964	239	2.48	141.00	9.77
1650	4/30/2013	16.00	7.37	0.960	240	2.32	214.00	9.76
1655	4/30/2013	15.87	7.37	0.975	241	2.28	258.00	9.75
1700	4/30/2013	15.78	7.38	0.990	242	2.64	253.00	9.76
1705	4/30/2013	15.79	7.36	0.990	244	2.24	251.00	9.76

Final Readings	1705	4/30/2013	15.79	7.36	0.990	244	2.24	251.00	9.76
			* C	units	mS/cm	mV	mg/L	NTU	

N. C. Department of Human Resources
Division of Health Services

WELL COMPLETION RECORD

PLETE ALL INFORMATION REQUESTED BELOW FOR EACH WELL INSTALLED, AND RETURN FORM TO THE N.C. ARTMENT OF HUMAN RESOURCES, SOLID AND HAZARDOUS WASTE MANAGEMENT BRANCH, BOX 2091, RALEIGH, N.C. 27602

E OF SITE: Greensboro Landfill

PERMIT NO.: Well No. 9 / II-4

RESS: Off White Street in Greensboro, NC

OWNER (print): City Of Greensboro

LING CONTRACTOR: Engineering Tectonics, P.A.

REGISTRATION NO.: 835

Type: SCH 40 PVC dia. 2 in.
Depth: from 0 to 16 ft. - dia. 2 in.
Type: PVC .010 Slot dia. 2 in.
Depth: from 16 to 26 ft. - dia. 2 in.

Grout Depth: from 0 to 13 ft. - dia. 6 in.
Bentonite Seal: from 13 to 14 ft. - dia. 6 in.
Sand/Gravel PK: from 14 to 26 ft. - dia. 6 in.
Total Well Depth: from 0 to 26 ft. - dia. 6 in.

Water Level: 13.16 feet from top of casing

Date Measured 7 / 12 / 89

(gpm): Low Method of Testing: Bail

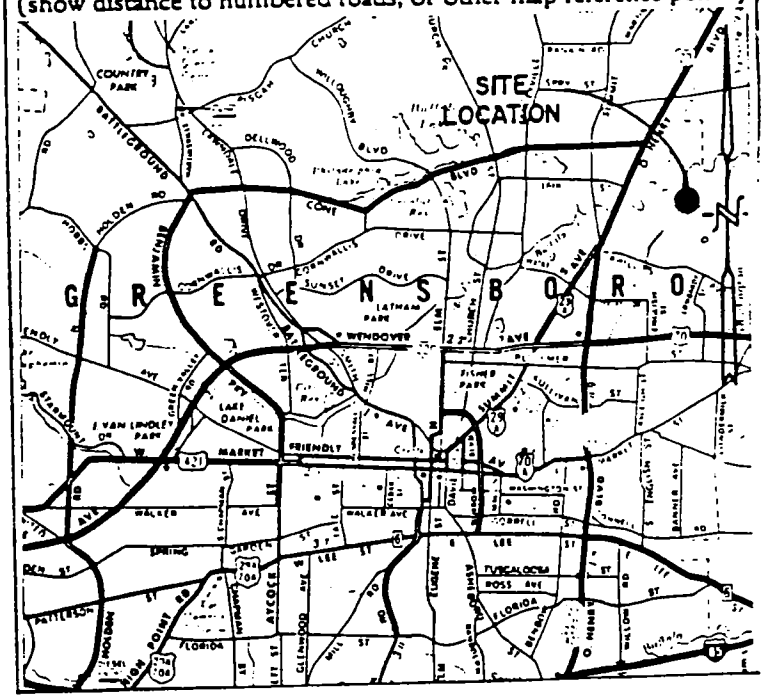
Casing is 3.42 feet above land surface

DRILLING LOG

DEPTH OM	TO	FORMATION DESCRIPTION
		See Attached Boring Log

LOCATION SKETCH

(show distance to numbered roads, or other map reference points)



ARKS:

E: 7-14-89 SIGNATURE:

142 (A-89)

– Proposed –

MONITORING WELL INSTALLATION SKETCH

PROJECT White Street Landfill
PIEZOMETER NUMBER II-4A
GROUND ELEVATION _____
DEPTH TO WATER LEVEL ±10'
BENCH MARK DATA _____
ELEVATION OF WATER LEVEL _____
ELEVATION OF TOP OF PIEZOMETER _____

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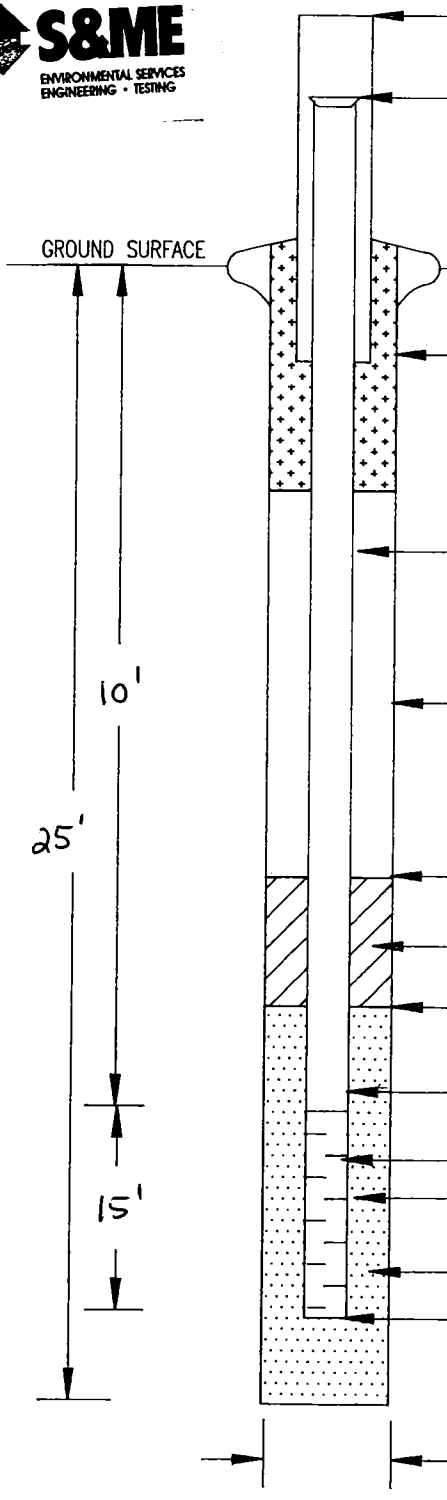

PROTECTIVE BOX W/LOCKING CAP
SEAL CAP
THICKNESS OF SURFACE SEAL: 0'–6' bgs
TYPE OF SURFACE SEAL: portland
I.D. OF RISER PIPE: 2-inch
TYPE OF RISER PIPE: PVC
TYPE OF BACKFILL: portland
ELEVATION OF TOP OF SEAL: 6' bgs
TYPE OF SEAL: bentonite
TOP ELEVATION OF FILTER SAND: 8' bgs
BOTTOM ELEVATION OF RISER: 10' bgs
SIZE OF SCREEN OPENINGS: 0.010
PIEZOMETER SCREEN DIAMETER: 2-inch
TYPE OF FILTER SAND: #2
BOTTOM ELEVATION OF PIEZOMETER: 25' bgs
DIAMETER OF BOREHOLE: 6¼"

bgs = below ground surface